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ARS 856 (2012) (English): Fresh dasheen –  
Specification



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## Fresh dasheen/taro — Specification and grading



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## Foreword

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## Introduction

Dasheen / Taro is a perennial, tropical plant primarily grown as a root vegetable for its edible starchy corm, and as a leaf vegetable and is considered a staple in African, Oceanic and Asian cultures. It is believed to have been one of the earliest cultivated plants. *Colocasia esculenta* is thought to have originated in the Indo-Malayan region, perhaps in eastern India and Bangladesh, and spread eastward into Southeast Asia, eastern Asia, and the Pacific islands; westward to Egypt and the eastern Mediterranean; and then southward and westward from there into East Africa and West Africa, whence it spread to the Caribbean and Americas. It is known by many local names and often referred to as 'elephant ears' when grown as an ornamental plant.

Dasheen is consumed as a staple crop in West Africa, particularly in Ghana, Nigeria and Cameroon. It is called cocoyam in Nigeria, Ghana and Anglophone Cameroon or macabo in Francophone Cameroon. Cocoyam, is often boiled, fried or roasted and eaten with a sauce. In Ghana, it substitutes plantain in making Fufu when plantains are out of season. It is also cut into small pieces to make a soupy baby food and appetizer called *mpotompoto*. It also common in Ghana to find Cocoyam chips (deep-fried slices, about 1 mm thick). Cocoyam leaves locally called *kontomire* in Ghana, is a popular vegetable for local sauces such as palaver sauce and egusi / agushi stew. In Kenya, Uganda and Tanzania, taro is commonly known as *Arrow root* or *Nduma* in some local Bantu languages. It is usually boiled and eaten with tea or other beverages, or as the main starch of a meal.

While a lot of taro is produced and consumed on a subsistence basis, quite a considerable amount is produced as a cash crop and an export commodity where the marketing infrastructure is well structure.

Dasheen is increasingly playing a significant role in food and nutrition security in many parts of Africa. This African Standard was prepared to establish the quality and safety requirements to facilitate trade in fresh dasheen.





## Fresh dasheen/taro — Specification and grading

### 1 Scope

This Standard applies to the tubercles of commercial varieties of dasheen/taro grown from *Colocasia esculenta* (L.) Schott of the *Araceae* family, to be supplied fresh to the consumer, after preparation and packaging. Dasheen for industrial processing are excluded.

**CAUTION! If dasheen/taro is not prepared and cooked well, the acidity will cause itchiness in the mouth and throat. All parts of taro can cause stomach aches, if ingested without cooking. Contact with the sap can irritate sensitive skin.**

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CAC/GL 21, *Principles for the Establishment and Application of Microbiological Criteria for Foods*

CAC/RCP 44, *Recommended International Code of Practice for the Packaging and Transport of Tropical Fresh Fruit and Vegetables*

CAC/RCP 53, *Code of Hygienic Practice for Fresh Fruits and Vegetables*

### 3 Definitions

For the purpose of this standard the following definition shall apply:

#### 3.1

##### **similar varietal characteristics**

means that corms in any lot shall have the same general shape, colour, characteristic of skin and flesh

#### 3.2

##### **fully mature**

means that the corms have reached full development and are firm with a tough skin and with no sprouting

#### 3.3

##### **clean**

means that the corms shall be free from adhering soil, insects, chemical deposit and other foreign matter

#### 3.4

##### **fairly clean**

the individual dasheen corm is not caked with dirt and that dirt or other foreign matter does not materially detract from the general appearance of the lot

#### 3.5

##### **fairly well shaped**

means that 85% or more of the corms shall not be curved with not more than two pseudo corm

**3.6**

**diameter**

the greatest dimension of the dasheen corm, measured at right angles to the longitudinal axis

**3.7**

**one type**

the corms have the same character of flesh, and do not show an extreme range in skin colour

**3.8**

**damage**

any defect or combination of defects of physical or physiological causes which detracts from the edible or marketing quality such as or bruises or growth cracks

**3.9**

**serious damage**

any defect or combination of defects of physical (external or internal) or physiological causes such as cuts or internal defection

**3.10**

**disease**

any defect or combination of defects caused by micro organisms

**3.12**

**well-shaped**

the corms shall have the shape characteristic of the variety and without the presence of pseudo corm

**3.13**

**weight**

the weight stated on the container shall be the minimum net weight delivered to the customer

**3.14**

**fresh**

the corms maintain their reaped appearance and are not withered or showing signs of dehydration

**3.15**

**well-trimmed**

in any lot 95% or more of the corms' surface area shall be free from root hairs with not more than 2.5 cm of corm at the apex

**3.16**

**fairly well trimmed**

in any lot 85% or more of the corms' surface area shall be free from root hairs with not more than 2.5 cm of corm at the apex

**4 Provisions concerning quality**

**4.1 General**

The purpose of the standard is to define the quality requirements of dasheen corms at the market control stage, after preparation and packaging.

**4.2 Minimum requirements**

**4.2.1** In all classes, subject to the special provisions for each class and the tolerances allowed, the dasheen must be:

- (a) whole;

- (b) sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- (c) clean, practically free of any visible foreign matter, except permitted substances used to prolong their shelf life;
- (d) practically free of pests affecting the general appearance of the produce;
- (e) practically free of damage caused by pests;
- (f) free of abnormal external moisture, excluding condensation following removal from cold storage;
- (g) free of any foreign smell and/or taste;<sup>1</sup>
- (h) firm and fully mature;
- (i) practically free of mechanical damage and bruising;
- (j) practically free of signs of sprouting.

**4.2.2** The dasheen must have been carefully harvested and have reached an appropriate degree of physiological development, account being taken of the characteristics of the variety and/or commercial type and the area in which they are grown.

The development and condition of the dasheen must be such as to enable them:

- to withstand transport and handling; and
- to arrive in satisfactory condition at the place of destination.

### 4.3 Classification

Dasheen corms classified in three classes defined below:

#### 4.3.1 Class I

Dasheens in this class must be of superior quality. They must be characteristic of the variety, well-shaped, free from damage and well-trimmed. They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

#### 4.3.2 Class II

Dasheens in this class must be of good quality. They must be characteristic of the variety, free from damage, well-shaped and fairly well trimmed. The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- slight defects in shape;
- scarring, provided this does not cover more than 20% of the surface area;
- scraped areas, provided these do not exceed 20% of the surface area.

The defects must not, in any case, affect the flesh of the produce.

<sup>1</sup> This provision allows for smell caused by conservation agents used in compliance with corresponding regulations.

## 4.3.3 Class III

This class includes dasheens which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in 4.2. They must be free from serious damage, fairly well-shaped and fairly well trimmed. The following defects, however, may be allowed, provided the dasheens retain their essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape;
- scarring, provided this does not cover more than 30% of the surface area;
- scraped areas, provided these do not exceed 30% of the surface area.

The defects must not, in any case, affect the flesh of the produce.

## 5 Provisions concerning sizing

Size is determined by the weight of the dasheen, in accordance with the following table:

Code	Size	Weight (in grams)
A	Large	>5000
B	Medium	2000 – 5000
C	Small	<2000

NOTE Size in each grade will be dependent on the market requirement.

## 6 Provisions concerning tolerances

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

### 6.1 Quality tolerances

#### 6.1.1 Class I

Not more than 5% by number or weight of dasheen shall fail to meet the specifications of this grade but meet those of Class II. There shall be zero tolerance for damage at the dispatching stage.

#### 6.1.2 Class II

Not more than 10% by number or weight of dasheen shall fail to meet the specifications of this grade but meet those of Class III. Damage shall not exceed more than 2% at the dispatching stage.

#### 6.1.3 Class III

Not more than 15% by number or weight of dasheen shall fail to meet the minimum quality and grade requirements.

### 6.2 Size tolerances

For all grade, ten percent (10%) by number or weight of dasheen corresponding to the size immediately below or above the size indicated on the package.

## 7 Provisions concerning presentation

### 7.1 Uniformity

The contents of each package must be uniform and contain only dasheens of the same origin, variety and/or commercial type, quality and size. The visible part of the contents of the package must be representative of the entire contents.



## 7.2 Packaging

Dasheens must be packed in such a way as to protect the produce properly. The materials used inside the package must be new<sup>2</sup>, clean, and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

Dasheens shall be packed in each container in compliance with CAC/RCP 44.

### 7.2.1 Description of containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the dasheens. Packages must be free of all foreign matter and smell.

## 8 Marking or labelling

### 8.1 Consumer packages

In addition to the requirements of ARS 56, the following specific provisions apply:

#### 8.1.1 Nature of Produce

If the produce is not visible from the outside, each package shall be labelled as to the name of the produce and may be labelled as to name of the variety and/or commercial type.

### 8.2 Non-retain containers

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or in the documents accompanying the shipment.

#### 8.2.1 Identification

Name and address of exporter, packer and/or dispatcher. Identification code (optional).<sup>3</sup>

#### 8.2.2 Nature of Produce

Name of the produce if the contents are not visible from the outside. Name of the variety and/or commercial type (optional).

#### 8.2.3 Origin of produce

Country of origin and, optionally, district where grown or national, regional or local place name.

#### 8.2.4 Commercial Identification

- Number of tubers per container (count);
- Variety;
- Class;
- Size (size code or minimum and maximum weight in grams);
- Net weight (optional).

<sup>2</sup> For the purposes of this Standard, this includes recycled material of food-grade quality.

<sup>3</sup> The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference "packer and/or dispatcher (or equivalent abbreviations)" has to be indicated in close connection with the code mark.

- Grower/lot identification
- Post-harvest chemical treatment of the dasheen (if any)
- Storage temperature

## 8.2.5 Official Inspection Mark (optional)

## 9 Contaminants

### 9.1 Heavy metals

Dasheen shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission for this commodity. The current limits are as indicated below:

Metal	Unit of measurement	Maximum limit	Test method
Lead (Pb)	mg/kg wet weight	0.10	ISO 6633 (AAS)
Cadmium (Cd)	mg/kg wet weight	0.10	ISO 6561-1 or 6561-2

### 9.2 Pesticide residues

Dasheen shall comply with those maximum pesticide residue limits established by the Codex Alimentarius Commission for this commodity.

## 10 Hygiene

**10.1** It is recommended that the produce covered by the provisions of this Standard be prepared and handled in accordance with the appropriate sections of ARS 53, CAC/RCP 53, and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

**10.2** The produce should comply with any microbiological criteria established in accordance with CAC/GL 21.



Dasheen/Taro farm and corms





Dasheen corms



Tannia (Dasheen) plant and corms  
(malanga, yawtia, yautia, tannia)

**Annex A**  
(informative)

**Cold storage and refrigerated transport**

**A.1 Scope**

This annex gives guidance on conditions for cold storage and refrigerated transport of fresh root vegetables.

It applies only to stemless root vegetables intended for long-term storage in large-capacity warehouses, or refrigerated transport. Requirements for the storage of root vegetables with leaves are considerably different and are applicable only to short-term storage.

**A.2 Field of application**

This annex applies to black radish (*Raphanus sativus*), blackroot (*Scorzonera hispanica*), carrot (*Daucus carota*), horseradish (*Armoracia rusticana*), parsley (*Petroselinum crispum* var. *tuberosum*), red beetroot (*Beta vulgaris* var. *cruenta*) and similar root crops.

**A.3 Characteristics for storage**

**A.3.1** Vegetables intended for long-term storage should be intact and firm without any mechanical damage, and be free of frost damage, rot, mould, parasites and disease. Excessive moisture on the surface of the roots and the presence of foreign odours or flavours should be avoided. Total removal of leaves is recommended. It is permitted to cut eaves smoothly with tops of roots of carrots, parsley, celeriac and beetroot.

**A.3.2** The vegetables may be stored in warehouses without preliminary cleaning or washing, however, the soil naturally adhering to the roots or bulb should not exceed 2 % of the root weight.

**A.3.3** Reference to standards for quality requirements valid for the individual types of root vegetable will minimize storage losses

**A.4 Putting into storage**

**A.4.1** Root vegetables may be stored in box pallets or individual wooden or plastic boxes, stacked on simple pallets to form handling units. Individual boxes on pallets may be formed onto storage blocks suitable for forklift trucks.

**A.4.2** The stacking height depends on the structure of the pallets and boxes but should conform to national standards for maximum loading. A common stacking height for individual boxes on pallets is 4 m, while that for box pallets is 6 m.

**A.4.3** It is necessary to leave a minimum of 25 cm to 30 cm of free space between the stacks and the ceiling, and between the walls of the warehouse and the nearest stack

**A.4.4** In order to facilitate the use of a fork-lift truck, a space of 25 cm to 30 cm is recommended between the stacks.

**A.4.5** Root vegetables may also be loose (or bulk) piled. The warehouse should be provided with interior bulkheads at least 1 m from the interior walls. Bulk piling may not be suitable for vegetables with long roots because of possible damage during mechanical filling and removal.

**A.5 Method of storage**

**A.5.1** Root vegetables should be packed in wooden or plastic boxes for storage and transport.



The sides and possibly the bottom of the individual containers should be provided with a sufficient number of ventilation holes to allow air circulation through the package.

Ventilation in the horizontal direction is preferred.

An evaporator should be located near the ceiling so that the cooled air, circulated by the evaporation fans above the stored vegetables, falls and is returned to the evaporator.

**A.5.2** The following conditions should be applied:

- high relative humidity may be provided by installation of a mechanical humidifier;
- air should be circulated within the room at a rate of 30 air changes per hour;
- the rate of ventilation with outside air should be 0.5 air changes per hour;
- if the mechanical refrigeration system is out order, ventilation with outside air should be stopped so that the temperature within the room is maintained for as long as possible.

## **A.6 Optimum storage and transport conditions**

**A.6.1** Root vegetables should be stored at

- a) temperature 0 °C to 2 °C;
- b) relative humidity: 90 % to 95 %.

**A.6.2** The storage room should be pre-cooled to 0 °C to 1 °C prior to loading; product loading should be completed in less than 7 days.

**A.6.3** When removed from storage, any moisture which may condense on the surface of the vegetables may be removed by holding the vegetables at 10 °C to 20 °C with adequate air circulation.

**A.6.4** Root vegetables should always be shipped in refrigerated transport maintained at a uniform temperature between 0 °C and 5 °C.

**Bibliography**

*Standard Specification for Dasheen*, Ministry of Lands and Agriculture, Republic of Jamaica, 1998

CODEX STAN 224:2001 (Rev. 2005), *Standard for Tannia*

ISO 9719:1995, *Root vegetables — Cold storage and refrigerated transport*

CODEX STAN 193:1995 (Rev.5:2009), *General Standard for Contaminants and Toxins in Foods*

CODEX STAN 228:2001 (Rev.1:2004), *General methods of analysis for contaminants*

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